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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT	:	Young-Hoon Kim et al.		
SERIAL NO.	:	10/607,466	EXAMINER	: Eric K. Wong
FILED	:	June 26, 2003	ART UNIT	: 2883
FOR	:	WAVELENGTH DIVISION MULTIPLEXER/DEMULTIPLEXER		

APPEAL BRIEF TRANSMITTAL LETTER

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA. 22313-1450

Dear Sir:

Appellants respectfully submit three copies of a Brief For Appellants that includes an Appendix with the pending claims. The Appeal Brief is now due on January 30, 2005.

Appellants enclose a check in the amount of $500.00 covering the requisite Government Fee.

Should the Examiner deem that there are any issues which may be best resolved by telephone communication, kindly telephone Applicants undersigned representative at the number listed below.

Respectfully submitted,

By: Steve Cha
Attorney for Applicant
Registration No. 44,069

Date: January 21, 2005

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Steve Cha, Reg. No. 44,069
(Name of Registered Rep.)

(Signature and Date)

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JAN 24 2005
PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Before the Board of Patent Appeals and Interferences

In re the Application

Inventor	**:**	**Yg-Hoon Kim**
Application No.	**:**	**10/607,466**
Filed	**:**	**June 26, 2003**
For	**:**	**WAVELENGTH DIVISION MULTIPLEXER/DEMULTIPLEXER**

APPEAL BRIEF

On Appeal from Group Art Unit 2883

Date: January 21, 2005

Steve Cha
Attorney for Applicant
Registration No. 44,069

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Steve S. Cha, Reg. No. 44,069
(Name of Registered Representative)

(Signature and Date)

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TABLE OF CONTENTS

I. REAL PARTY IN INTEREST

The real party in interest is the assignee of the present application, Samsung Electronics, Co., Ltd., and not the party named in the above caption.

II. RELATED APPEALS AND INTERFERENCES

With regard to identifying by number and filing date all other appeals or interferences known to Appellant which will directly effect or be directly affected by or have a bearing on the Board's decision in this appeal, Appellant is not aware of any such appeals or interferences.

III. STATUS OF CLAIMS

Claims 10-13 have been presented for examination. All of these claims are pending, stand finally rejected, and form the subject matter of the present appeal.

IV. STATUS OF AMENDMENTS

An Amendment After Final Rejection filed in the U.S. Patent Office on October 18, 2004 has been entered.

V. SUMMARY OF THE INVENTION

A wavelength division multiplexer/demultiplexer (WDM) 200 for use in a planar lightwave circuit (PLC) having an arrayed waveguide grating 211 including a plurality of optical waveguides. The WDM 200 has an input waveguide 413 for inputting a multiplexed optical signal to the grating 211, and output waveguides, 213a, 215a for outputting single-channel optical signals demultiplexed by the grating.

In particular, the multi-channel waveguide 413 on one side of the AWG 211 may input a signal that is demultiplexed by the AWG and subsequently outputted to the waveguides 213a or 215a, as appropriate, on the other side of the AWG (page 13, lines 12-18).

Moreover, separate input signals may be inputted to the waveguides 213a or 215a, multiplexed by the AWG, and output as a single signal by the multichannel waveguide 413 on the opposite side of the AWG (page 13, line 19 to page 14, line 4).

Due to the two separate functions described by the previous paragraph and the paragraph before that previous paragraph, the WDM 200 is properly characterized as bi-directional.

The WDM 200 comprises an input waveguide 413 having a first sub-waveguide 413a (FIG. 2), whose width gradually increases in a progressing direction of the optical signal such that, starting at an input of the sub-waveguide and with the gradual increase, tapering of the sub-waveguide is directed inwardly in a concave manner.

The WDM 200 further comprises a second sub-waveguide 413b, continuously joined to the first sub-waveguide 413a, whose width gradually decreases in the progressing direction of the optical signal passing through the first sub-waveguide, wherein the input waveguide 413, comprising the first and second sub-waveguides 413a, 413b, is respectively disposed on both sides of the substrate 201 centering on the arrayed waveguide grating 211, and the output waveguides 213a, 215a arranged in parallel with the input waveguide 413 are respectively disposed on both sides of the substrate centering on the arrayed waveguide grating.

VI. ISSUE

Whether claims 10-13 are patentable under 35 U.S.C. 102(b) over U.S. Patent No. 6,563,988 to McGreer (hereinafter "the '988 patent").

VII. GROUPING OF CLAIMS

Claims 10-13 stand or fall together.

VIII. ARGUMENT

Claim 10 recites:

> the input waveguide, comprising the first and second sub-waveguides, is respectively disposed on both sides of the substrate centering on the arrayed waveguide grating, and the output waveguides arranged in parallel with the input waveguide are respectively disposed on both sides of the substrate centering on the arrayed waveguide grating

The inventive construction is discussed in the specification at page 14, lines 5-10.

The '988 patent is directed to reducing group velocity dispersion (GVD) in which a channel signal overlaps to interfere with a temporally adjacent signal on the channel (col. 1, lines 30-37). The approach in the '988 patent is based upon a mode converting tapered waveguide that is joined, on the same light path, to a mode conserving extension that preferably does not provide mode conversion (col. 7, lines 20-28).

For the fourth embodiment of the '988 patent, illustrated in FIG. 8, the width of the taper extension decreases in a light propagating direction, the decrease being

sufficiently gradual so as to introduce merely a small amount of mode conversion (col. 15, lines 14-19).

Although several potential shapes are mentioned for the taper extension (col. 15, lines 20-33), including a sinusoidal function having several periods, and that of "any other mathematical function," the '988 patent neither discloses nor suggests any interference effect on neighboring channels.

By contrast, the present invention relates to structures of input waveguides that reduce inter-channel interference (page 16, lines 10-14), thereby giving rise to the bidirectional WDM of present claim 10.

In particular, the '988 patent fails to disclose or suggest the above-quoted feature of the present claim 10.

Neither the final Office Action (hereinafter "Office Action") nor the Advisory Action specifies where the features of present claim 10 are deemed to be located within the '988 patent. In fact, the Advisory Action merely offers that "Applicant's arguments have been considered but Examiner believes they fail to clearly place the case in condition for allowance."

Item 4 of the Office Action first refers to FIG. 8 of the '988 patent. However, FIG. 8, as mentioned above, is directed to the fourth embodiment of the '988 patent. The fourth embodiment features a decrease in width of the taper extension in a light propagating direction, the decrease being sufficiently gradual so as to introduce merely a small amount of mode conversion. It is unclear how this disclosure of FIG. 8 relates to the present claim 10 feature "wherein the input waveguide, comprising the first and second sub-waveguides, is respectively disposed on both sides of the substrate

centering on the arrayed waveguide grating, and the output waveguides arranged in parallel with the input waveguide are respectively disposed on both sides of the substrate centering on the arrayed waveguide grating."

Item 4 of the Office Action next refers to "FIG. 3."

Although no FIG. 3 exists in the '988 patent, the Office Action presumably refers to FIGs. 3A, B, C.

FIG. 3A shows "one or more input (or first) channel waveguides 160" (col. 7, lines 54-55), "one or more output (or second) channel waveguides 200" (col. 7, lines 57-58). FIG. 3A also shows an arrayed waveguide grating ("AWG") 180 that connects on one side to a first slab waveguide 170 and on the other side to a second slab waveguide 190. The interface between the slab waveguide 170 and the first channel waveguides 160 is a transition segment 215. Another coupling may exist between the second slab waveguide 190 and the second channel waveguides 200.

FIGs. 3B, 3C show, in more detail, how the couplings look for a corresponding channel on the output and input sides respectively (col. 9, lines 1-3). For clarity, what the '988 patent regards as the inventive transition segment is shown on the input side only. However transition segments may be incorporated "on the output side of the AWGR [i.e., AWG], <u>on both the input and output side, or</u> <u>any combination of the two sides</u>" (col. 9, lines 3-8).

The underlined portion says that: a) the inventive transition segment may be on all channels on the input side and all channels on the output side, or b) the inventive transition segment may be, for either the input side, output side or both, on some channels and not on others (see, for example, col. 10, lines 14-16).

Notably, the first paragraph in column 9 of the '988 patent consistently maintains that there exists an input side and an output side, whereas the present claim 10 describes a bi-directional arrangement ("wherein the <u>input</u> waveguide, comprising the first and second sub-waveguides, is respectively disposed on <u>both</u> sides of the substrate centering on the arrayed waveguide grating, and the <u>output</u> waveguides arranged in parallel with the input waveguide are respectively disposed on <u>both</u> sides of the substrate centering on the arrayed waveguide grating.")

It is accordingly unclear how the immediately-above-quoted language of the present claim 10 can properly be said to be disclosed in the '988 patent.

With respect to claim 10, the '988 patent discloses at best, and as seen in its FIG. 10, <u>two</u> input waveguides and multiple output waveguides arranged consecutively on the same side with the input <u>waveguides</u>. Even at that, the waveguides connect to an integrated reflection grating (hereinafter "IRG"), rather than to an AWG. In addition, there is no other side, as in claim 10 of the present invention.

With regard to any suggestion that the IRG of the '988 patent is an AWG, the term "integrated reflection grating" does not appear to have been used widely enough to be considered a term of art, although, even if it is a term of art, another McGreer patent, U.S. Patent No. 6,697,552 (hereinafter "the '552 patent) indicates that an IRG is distinct and different from an AWG. This latter patent, the '552 patent, is incorporated by reference into the '988 patent. The '552 patent also says that an IRG is made by "depositing a high reflection coating onto the surface exposed by the etching process," i.e., the surface etched to make a pattern resembling a diffraction pattern. An AWG, by contrast, features no high reflection coating. The AWG instead operates by spreading out

input light into multiple AWG arms where the respective light undergoes differing delays generating a phase difference among the light beams that affects how the light beams recombine at the output. Accordingly, in view of FIG. 10 of the '988 patent, it is unclear how the FIG. 10 embodiment can be construed as, or even obviously modified into, a parallel configuration disposed on both sides of an AWG as in the present invention.

Notably, the '988 patent does not disclose or suggest that any of its AWG-based WDM embodiments is a bi-directional WDM. In particular, the '988 patent fails to disclose or suggest the above-quoted limitations appearing explicitly in claim 10.

For at least the foregoing reasons, the '988 patent fails to anticipate the invention as recited in claim 10. Reconsideration and withdrawal of the rejection is respectfully requested.

Moreover, the prior art of record, alone or in combination, does not appear to make obvious the invention as recited in claim 10 of the present invention.

As to the other rejected claims, each depends from the base claim 10 and is deemed to be patentable over the cited reference at least due to its dependency.

IX. CONCLUSION

In view of the above analysis, it is respectfully submitted that the referenced teachings, whether taken individually or in combination, fail to anticipate or render obvious the subject matter of any of the present claims. Therefore, reversal of all outstanding grounds of rejection is respectfully solicited.

Respectfully submitted,

Steve S. Cha
Registration No. 44,069

Attorney for Applicant

Date: 1/21/05

X. APPENDIX: THE CLAIMS ON APPEAL

10. A wavelength division multiplexer/demultiplexer for use in a planar lightwave circuit (PLC) having an arrayed waveguide grating including a plurality of optical waveguides, an input waveguide for inputting a multiplexed optical signal to the grating, and output waveguides for outputting single-channel optical signals demultiplexed by the grating, the wavelength division multiplexer/demultiplexer comprising:

an input waveguide having,

a first sub-waveguide, whose width gradually increases in a progressing direction of the optical signal such that, starting at an input of the sub-waveguide and with the gradual increase, tapering of the sub-waveguide is directed inwardly in a concave manner; and

a second sub-waveguide, continuously joined to the first sub-waveguide, whose width gradually decreases in the progressing direction of the optical signal passing through the first sub-waveguide, wherein the input waveguide, comprising the first and second sub-waveguides, is respectively disposed on both sides of the substrate centering on the arrayed waveguide grating, and the output waveguides arranged in parallel with the input waveguide are respectively disposed on both sides of the substrate centering on the arrayed waveguide grating.

11. The wavelength division multiplexer/demultiplexer as set forth in claim 10, wherein the first sub-waveguide has a parabolic horn shape.

12. The wavelength division multiplexer/demultiplexer as set forth in claim 10, wherein the second sub-waveguide has a predetermined shape having a width that linearly decreases in the progressing direction of the optical signal passing through the first sub-waveguide.

13. The wavelength division multiplexer/demultiplexer as set forth in claim 10, wherein the second sub-waveguide has a parabolic horn shape having a width that gradually decreases in the progressing direction of the optical signal passing through the first sub-waveguide.